

8.5 D+F - Chemical Formulas + Equations

recognize → Chemical formulas are used to identify substances + determine the number of atoms of each element in chemical formulas containing subscripts

- AND -

Recognize whether a chemical equation containing coefficients is balanced or not + how that relates to the Law of Conservation of Mass.

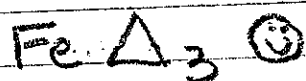
Look at these symbols. Write the quantity of each one -

☆ ☺ □ △₂

☆ - 1
☺ - 3
□ - 1
△ - 2

□₄ △ ☆ H

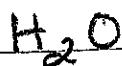
□ - 4
△ - 1
☆ - 1
H - 1



Fe - 1

Δ - 3

$\textcircled{\text{S}}$ - 1

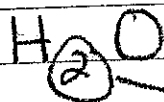


H - 2

O - 1

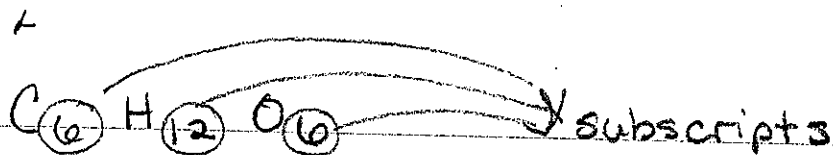
H_2O is the chemical formula for water.

A molecule of water contains 2 H atoms + 1 O atom



$\textcircled{2}$ \rightarrow subscript - small # after an element; describes the # of atoms of an element within that formula

There is no subscript after O, because there is only 1 atom of O in a water molecule. When there is no subscript, it is understood there is only 1 atom

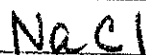


Sub - means "below"
script - "written"

C - 6

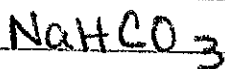
H - 12

O - 6



Na - 1

Cl - 1



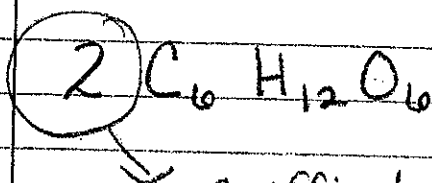
Na - 1

H - 1

C - 1

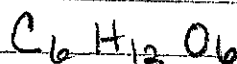
O - 3

- Every time you see an uppercase letter, that represents an element. Elements will never start @ a lower case letter.

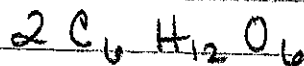


coefficient - written before a chemical formula; tells us how many molecules

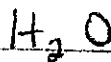
1 molecule of glucose



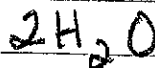
2 molecules of glucose



1 molecule of water



2 molecules of water

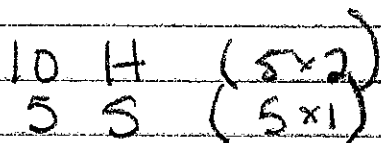
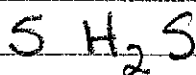
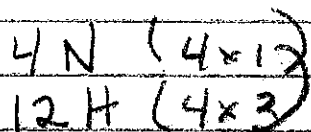
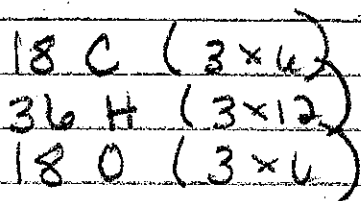
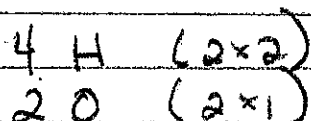




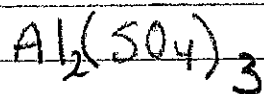
When a molecule has a coefficient, distribute by multiplying the coefficient \times each number of atoms in each element -

eg.

$2\text{H}_2\text{O}$ = In 2 molecules of water,
There are a total of:



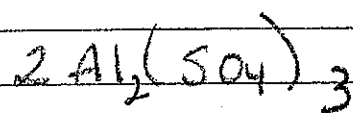
Sometimes, you will see parentheses followed by a subscript. Distribute the subscript by multiplying that # times each element in the parentheses.



$$\text{Al} = 2$$

$$\text{S} = 3$$

$$\text{O} = 12$$



Multiply the # of atoms in each molecule, X the coefficient to get the total # of atoms

$$\# \text{ Al}$$

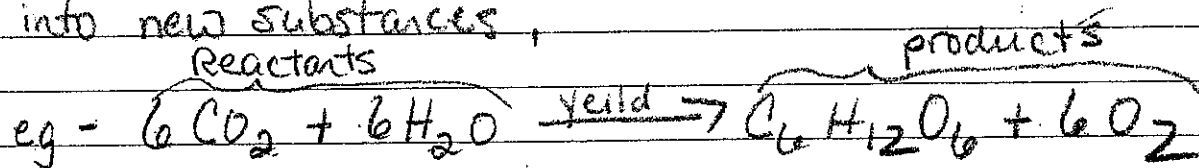
$$6 \text{ S}$$

$$24 \text{ O}$$

Balancing Chemical Equations:

Law of Conservation of Mass: matter cannot be created or destroyed; it can only be transformed into different types of matter or energy.

In a chemical Rx, atoms are rearranged into new substances,



$$\text{C} = 6 (6 \times 1)$$

$$=$$

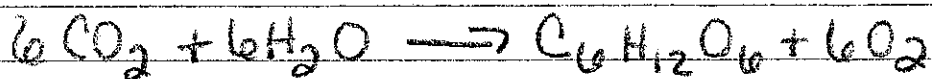
$$\text{C} = 6$$

$$\text{O} = 18 (6 \times 2) + 6$$

$$\text{O} = 18$$

$$\text{H} = 12 (6 \times 2)$$

$$\text{H} = 12$$



The number of atoms of each element on the reactants side must = the number of atoms of each element on the products side.

Balancing Equations:

- * Only change coefficient, never change subscript.